

Crime Lab 101: An Overview of the Indiana State Police Laboratory Division



Paulita Thomason, Laboratory Manager



History

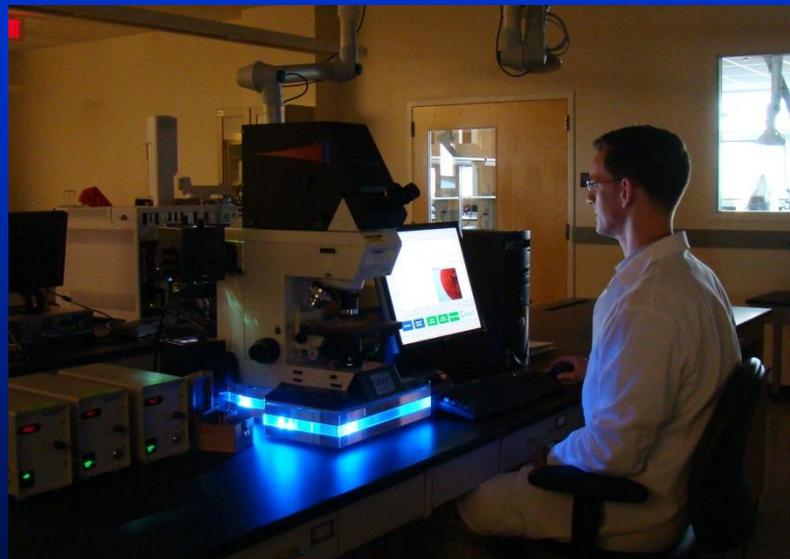
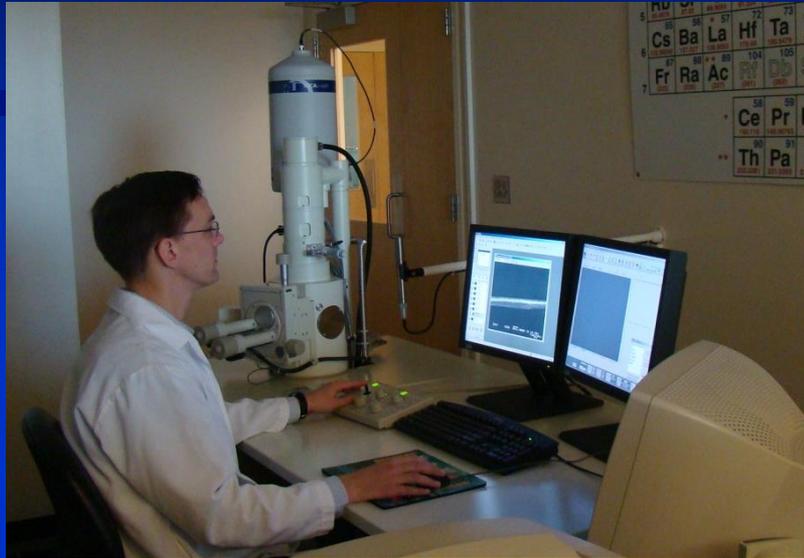


- 1933
 - Indiana State Police organized
- 1936
 - Indiana State Police Crime Laboratory established
- ***"The Indiana State Police Laboratory Division values integrity, service, competency, transparency, and accountability in all of our actions."***
- **– Major Steven D. Holland, Laboratory Division Commander**

INDIANA STATE POLICE LABORATORY 1936



INDIANA STATE POLICE LABORATORY TODAY



INDIANA STATE POLICE LABORATORY DIVISION

MISSION STATEMENT

To provide client agencies accurate, reliable and timely crime laboratory services within the resources provided and to manage the evidence security system of the Indiana State Police Department.

Maureen Spence D. Helms

Division Commander

May 1, 2015

Date

ISP Crime Laboratory

□ Four Regional Laboratories

- Lowell (1977)
- Fort Wayne (1978)
- Evansville (1979)
- Capital improvements started in the summer of 2020 (FWRL) – others to follow
- Indianapolis 3 locations
 - 1936 - Basement of state office building
 - 1981 - D52 post (8,000 sq. feet)
 - 2007 - current downtown location (75,000 sq. feet)

□ 180 employees (includes 40 sworn officers & 140 civilians)

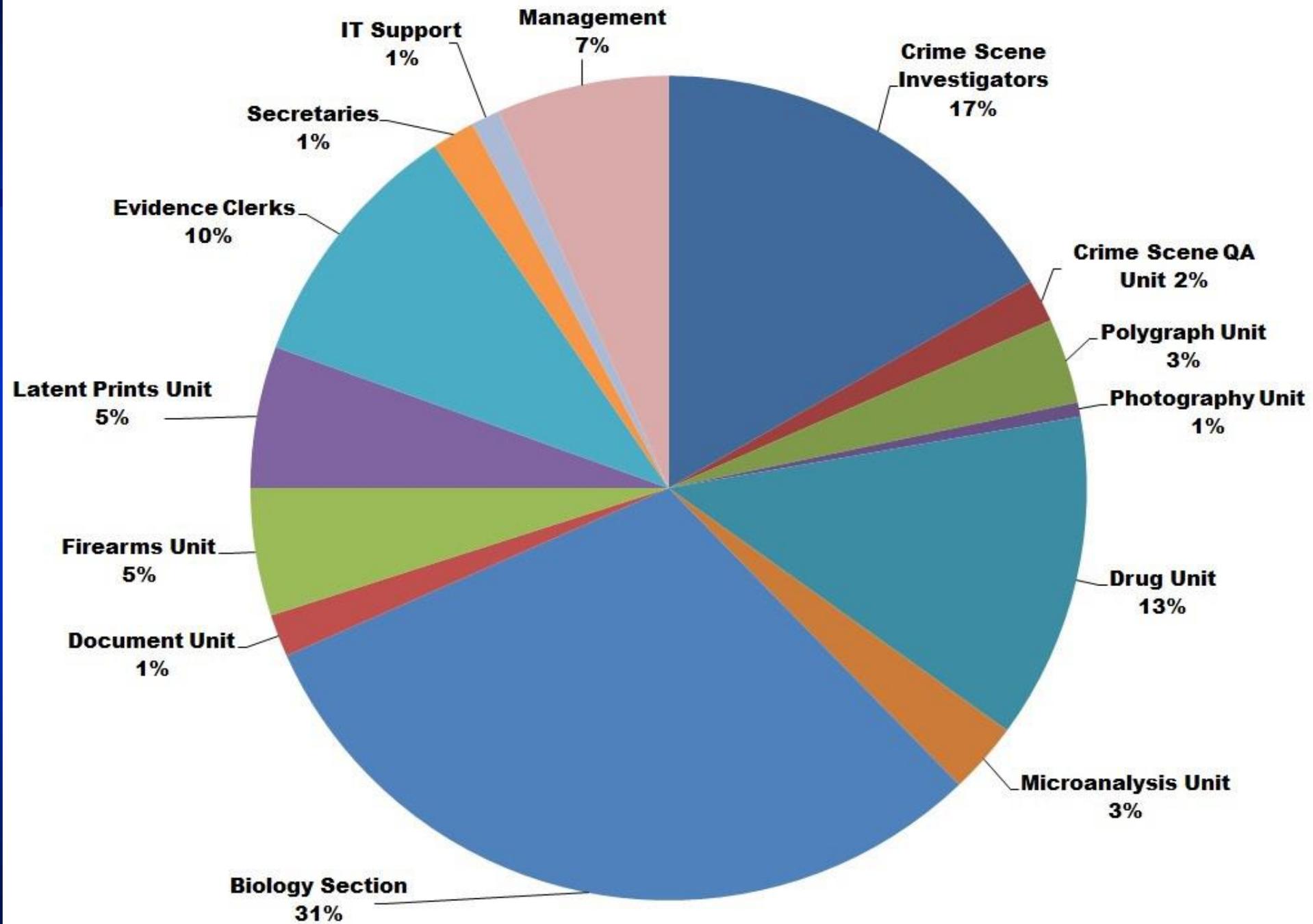
□ Accredited since June 1, 1991

□ American National Standards Institute (ANSI) National Accreditation Board (ANAB)

□ 5 sections:

- Biology (Serology, DNA, CODIS)
- Chemistry (Drug Identification, Microanalysis)
- Comparative Science (Firearms, Latent Prints, Documents)
- Crime Scene and Field Support (CSI, Polygraph)
- Management and Administration (Administrative and support personnel)

Laboratory Division Staff

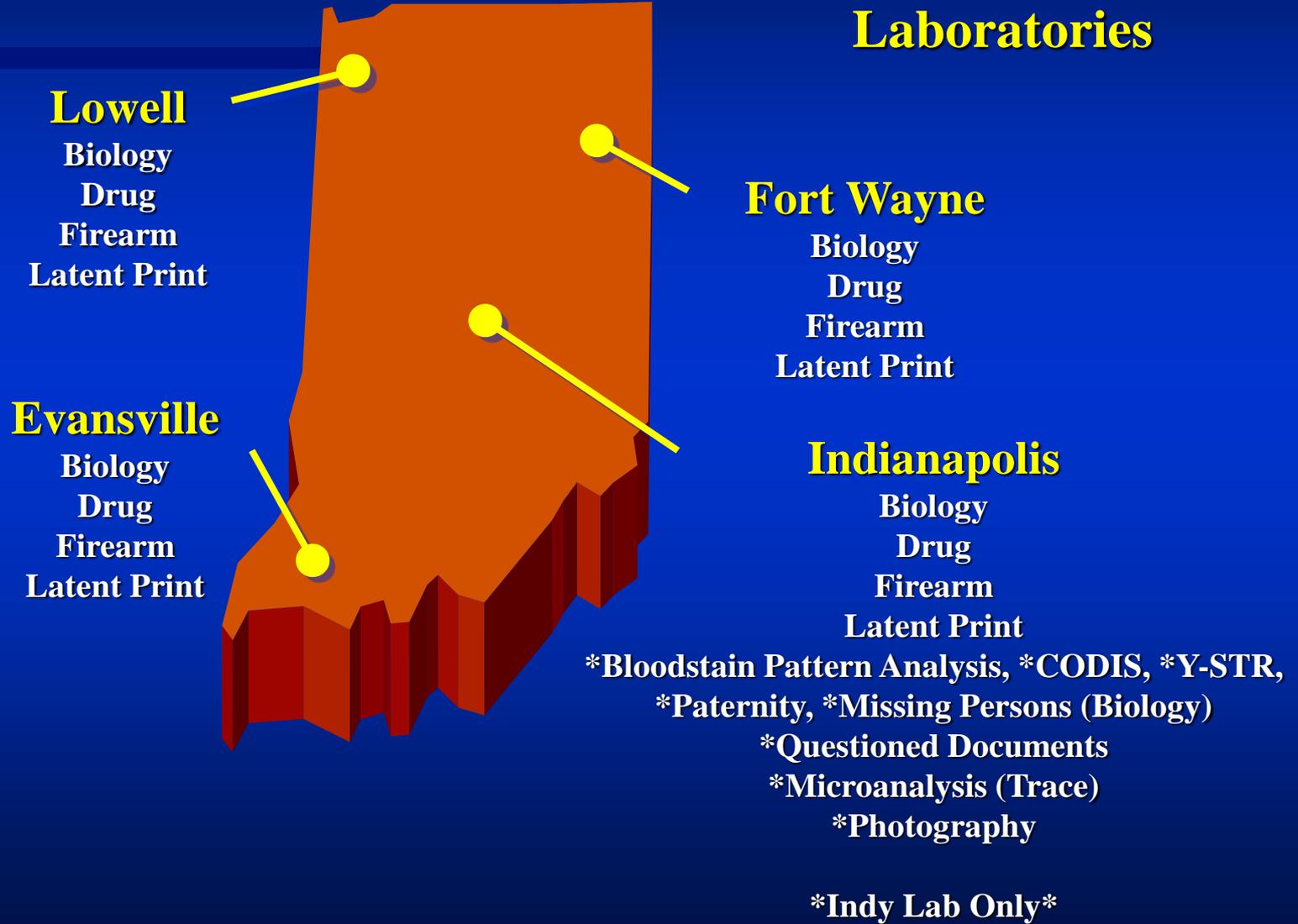


The four regional laboratories provide forensic services at no charge to federal, state, county and local agencies throughout Indiana.

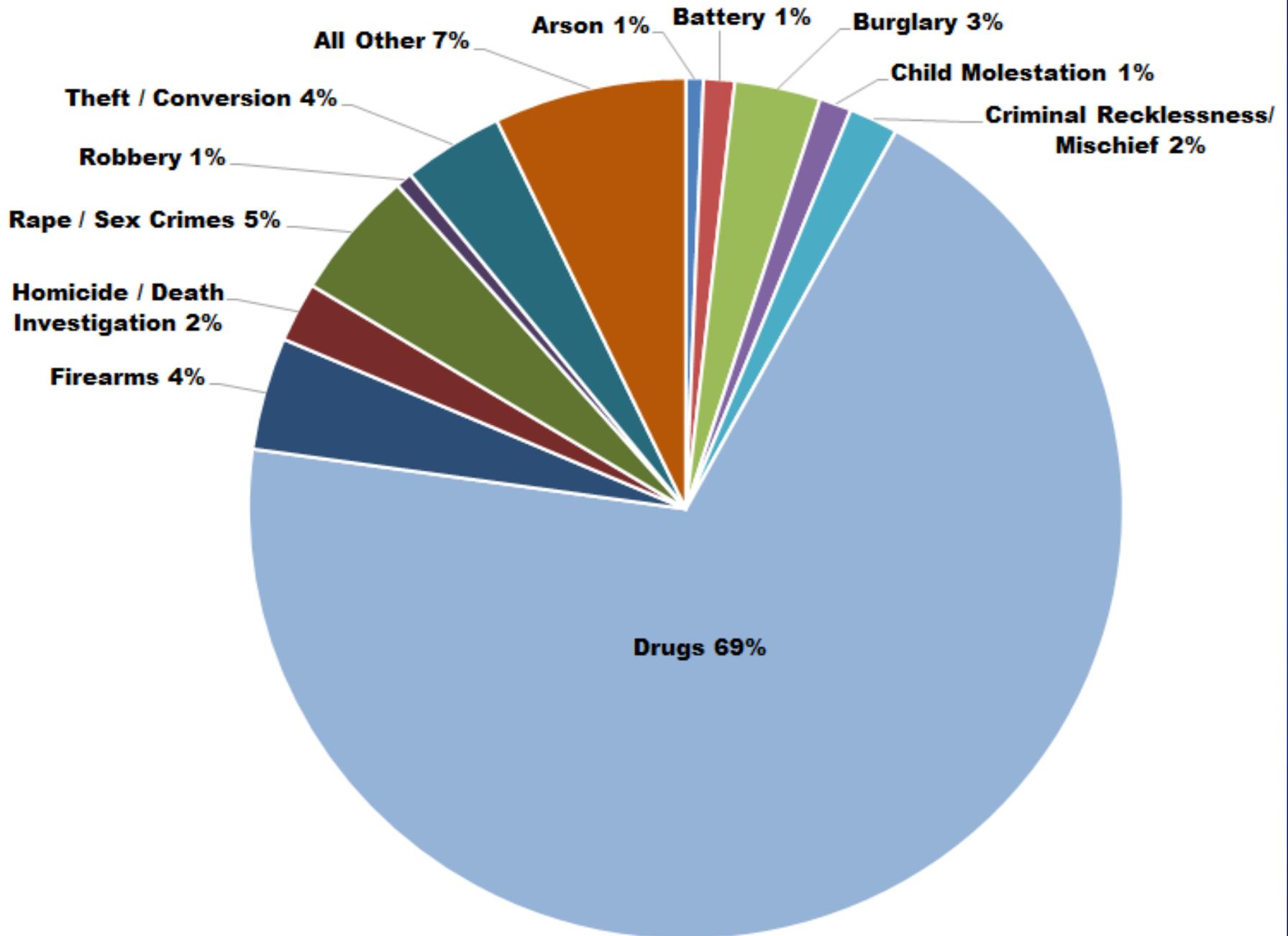
Evidence Submission Areas



Indiana State Police Regional Forensic Laboratories



Types of Crimes and Percentage of Laboratory Submissions



Evidence Receiving

- Evidence Clerks are the “gatekeepers”
- Establishes “chain of custody” as items enter the laboratory
- Responsible for:
 - Receiving evidence from contributors
 - Storage of evidence
 - Transfer of evidence to analysts or other laboratories
 - Evidence audits and destruction





Oversized drug evidence



Walk-in refrigerator

Drug evidence



General evidence vault



Walk-in freezer

Forensic Biology

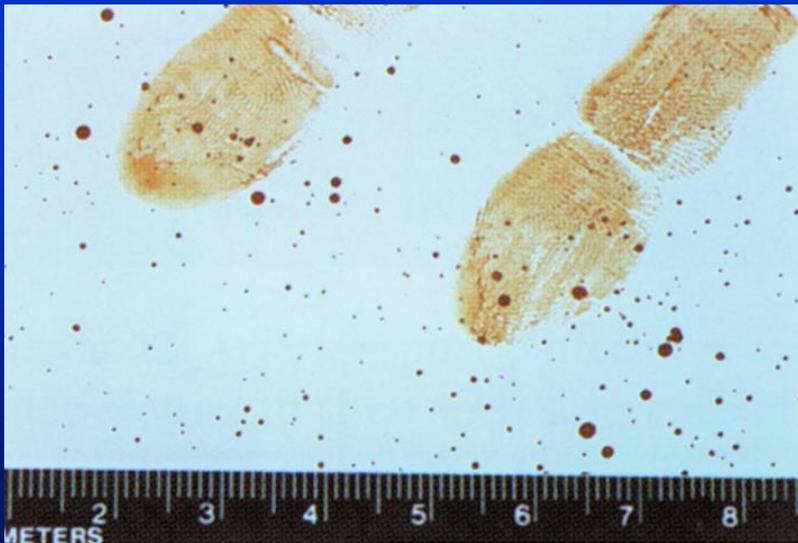
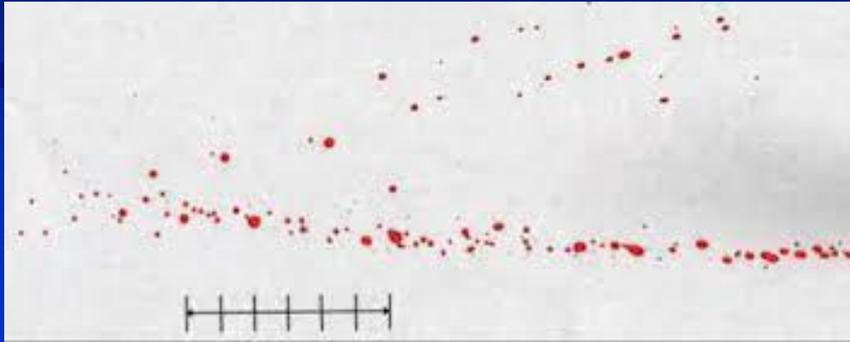


Biology Unit

- Identify stains and substances of biological origin
- All nucleated cells contain DNA
- Only identical twins have the same DNA
- Extract, quant, amplify, analyze, and interpret DNA profiles
- Sources for DNA:
 - Bloodstains
 - Weapons
 - Cigarette butts
 - Clothing
 - Hats
 - Soda cans



Bloodstain Pattern Interpretation



What Has Changed?

- With the advent of DNA technology, the demand for service outstripped our output capability
- For example:
- 1996 – 250 DNA case requests
- 2020 – 4,392 case requests

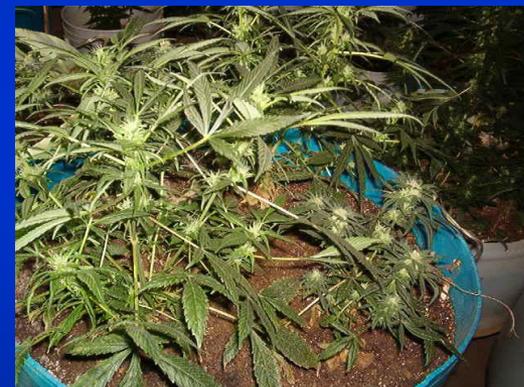


Drug Identification

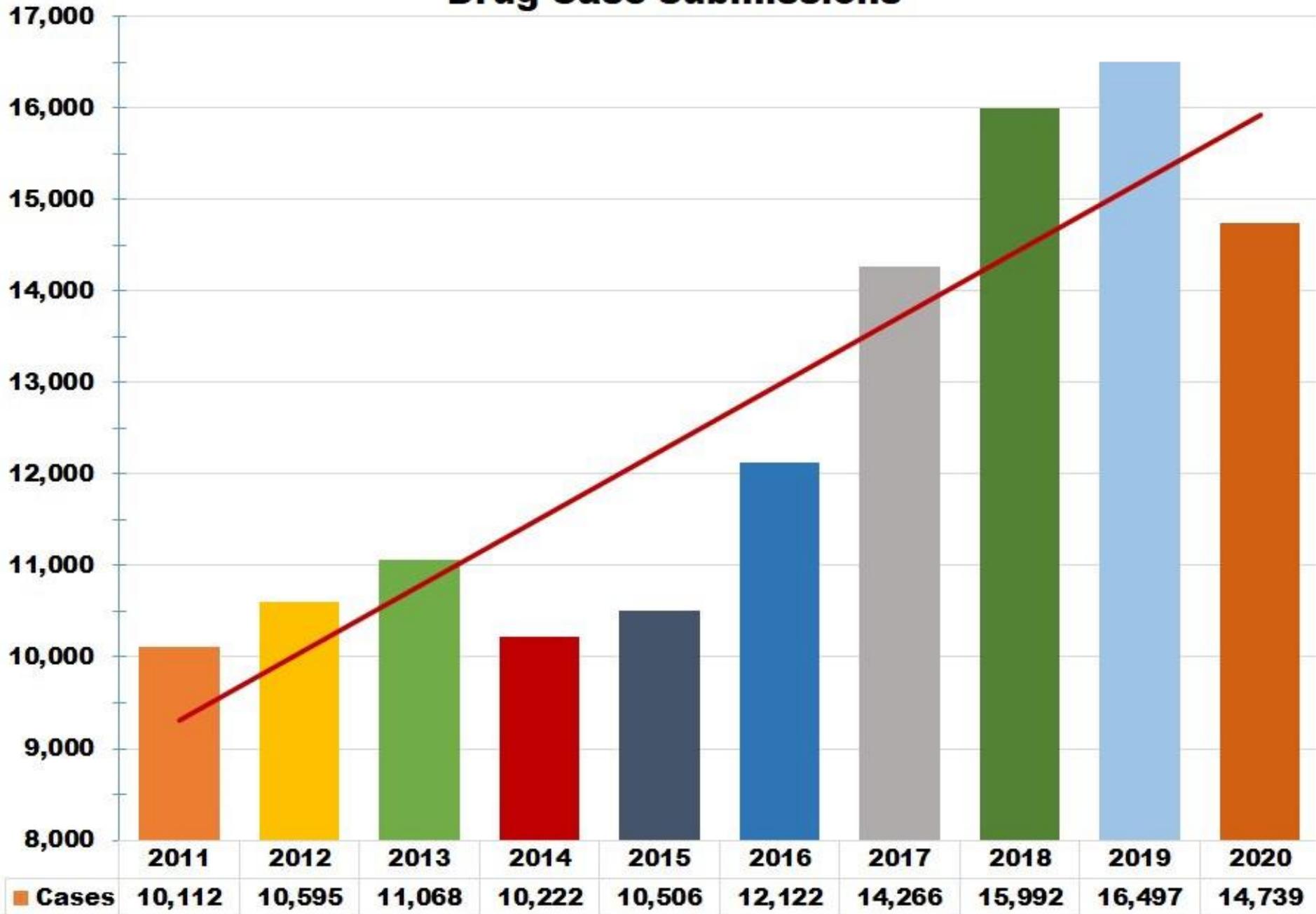


Drug Unit

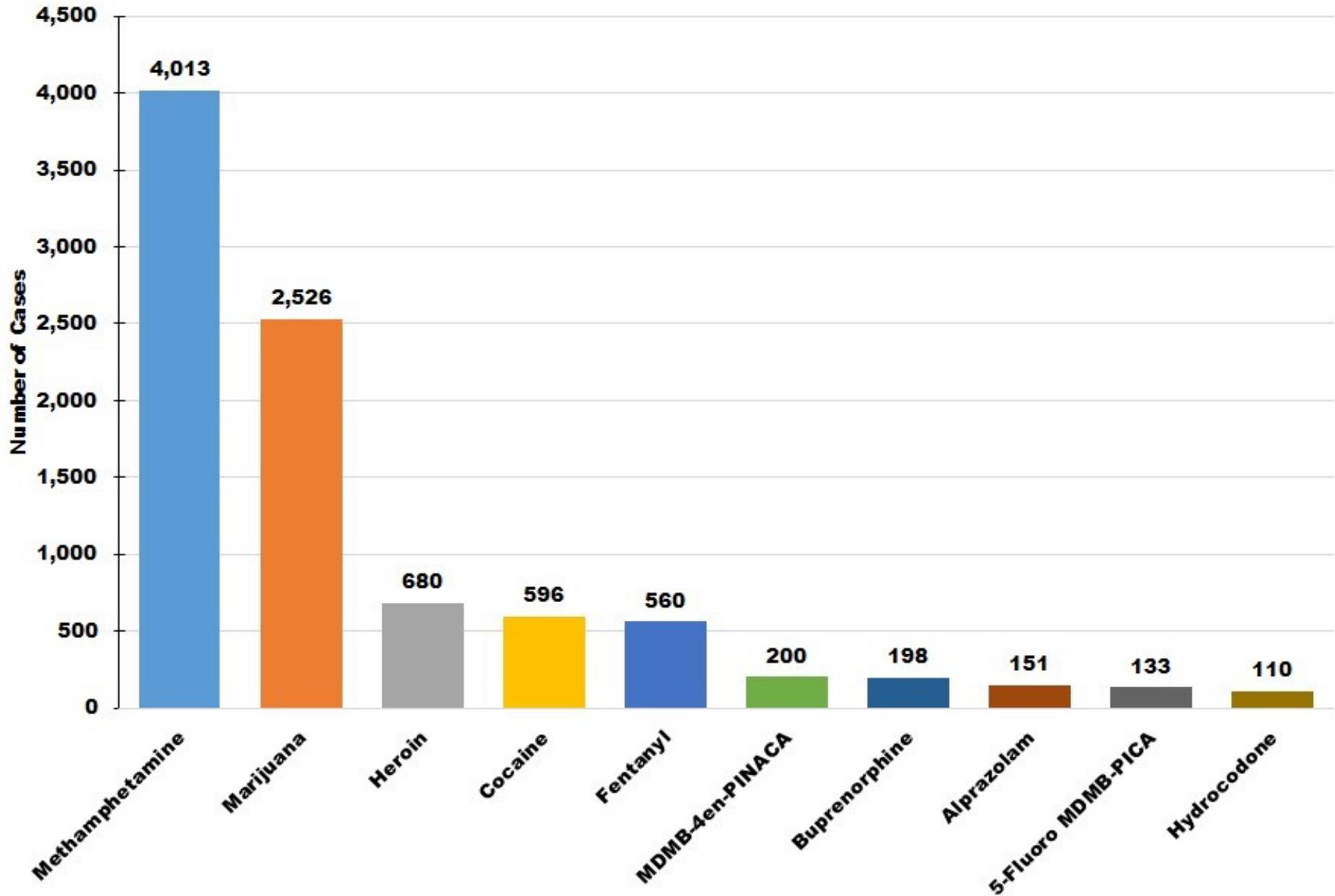
- Analyze samples for the presence of controlled substances
- Investigate clandestine laboratories
- Types of drug samples examined:
 - Powders: methamphetamine, cocaine, heroin
 - Tablets: ecstasy, oxycodone, valium
 - Liquids: GHB, PCP, LSD
 - Botanicals: marijuana, mushrooms



Drug Case Submissions



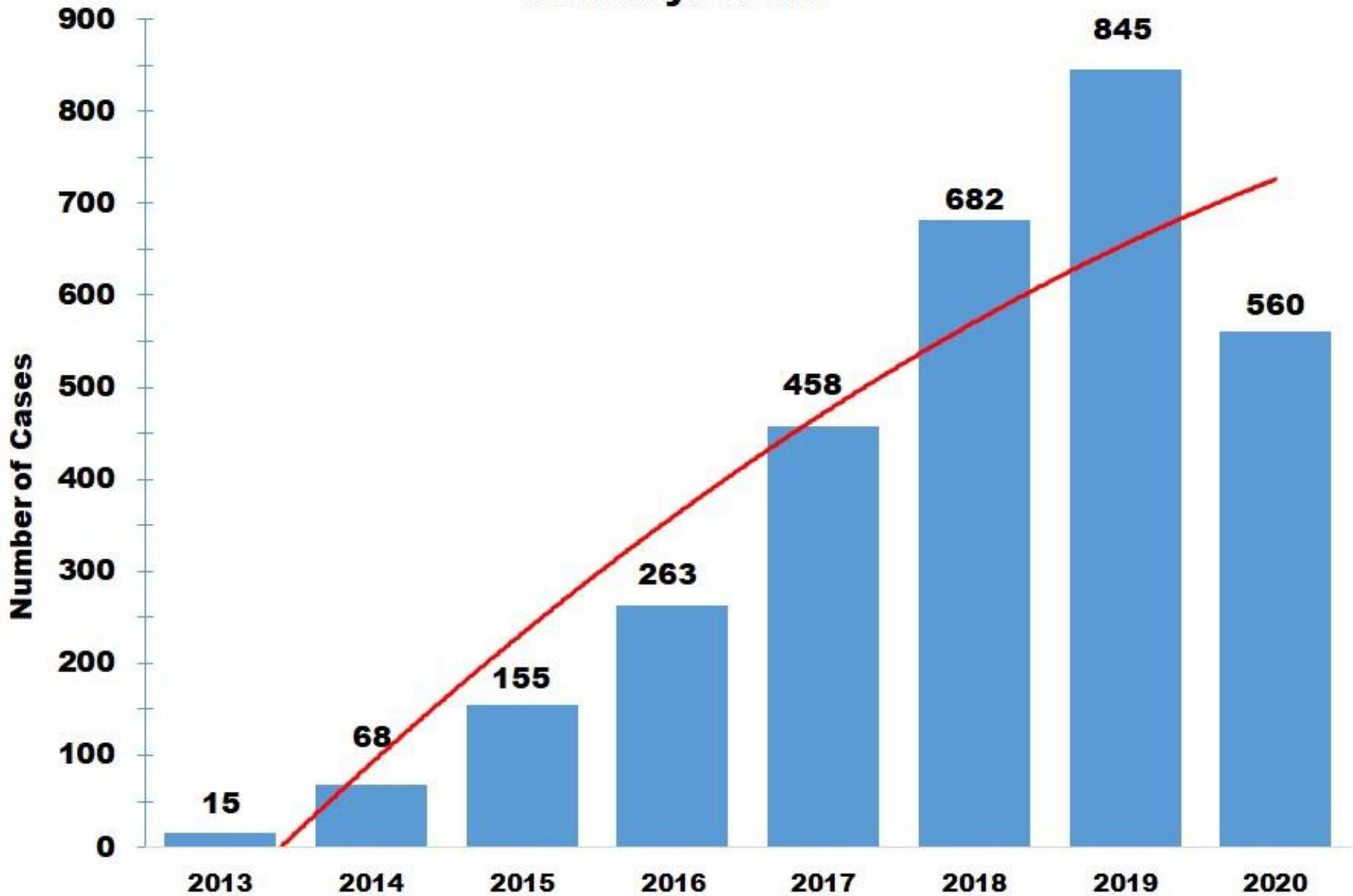
2020 Top 10 Drugs Identified



Fentanyl Analysis



Fentanyl Trend



Clan Lab Scene



MICROANALYSIS

... aka Trace Evidence

Substances, that may or may not be visible to the unaided eye, that are transferred from one person, place or thing to another person, place or thing as a result of contact.



Trace Unit

Types of trace evidence:

Fire debris

Paint

Glass

Fibers

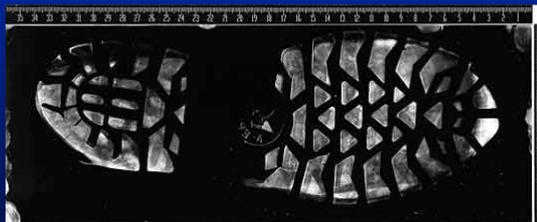
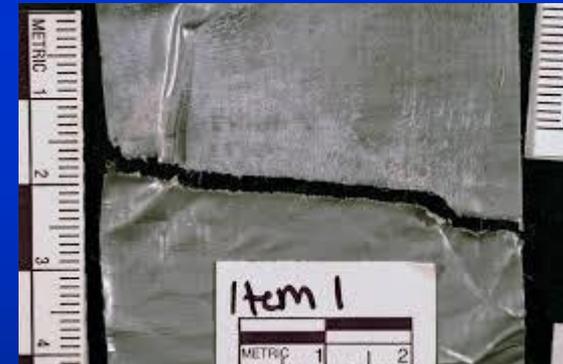
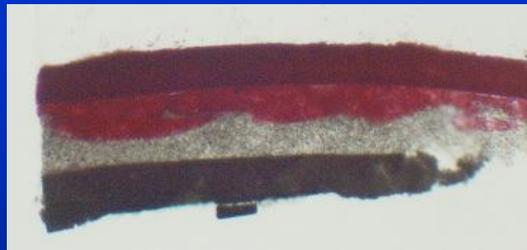
Tape

Footwear, tire
impressions

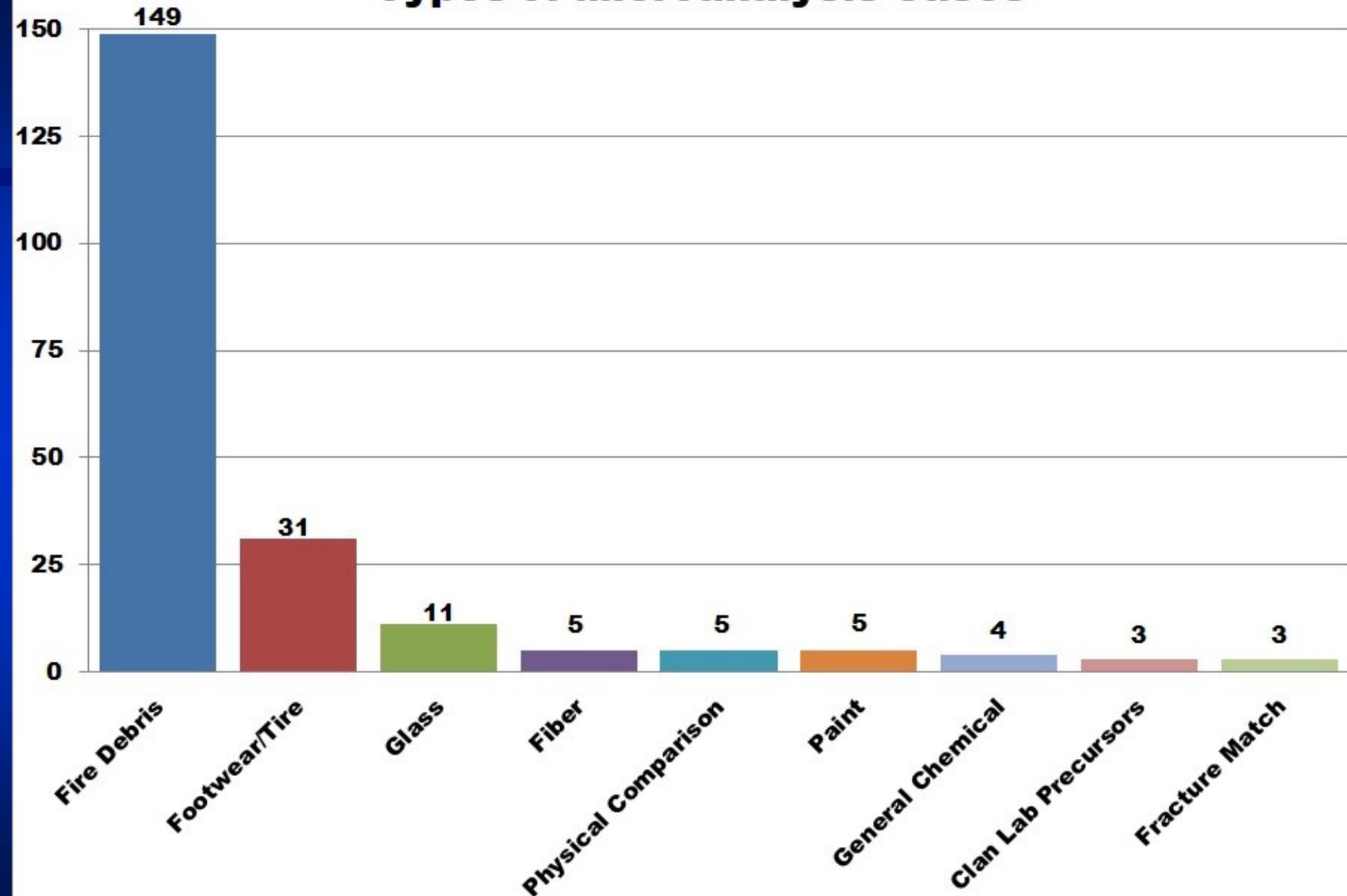
Vehicle lamps

Fracture match/puzzle
match

Unknown materials

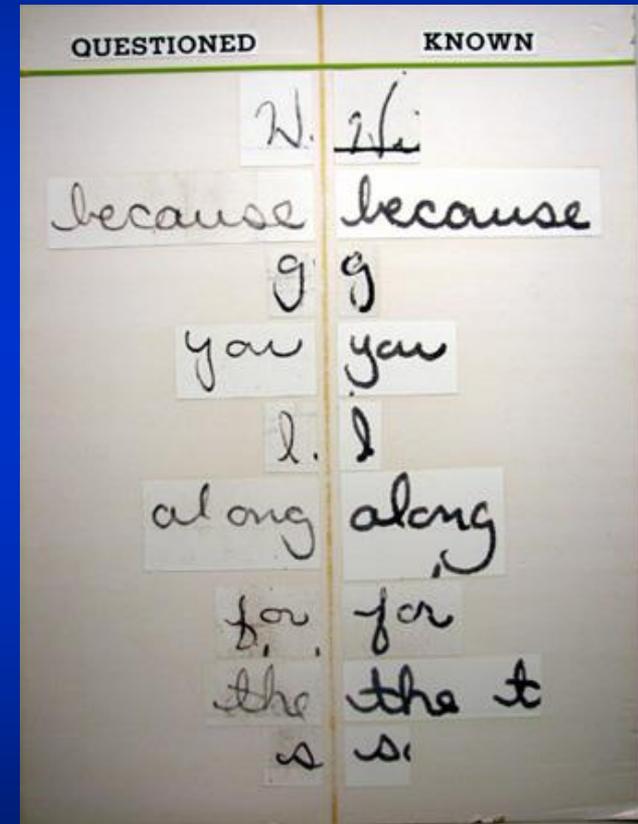


Types of Microanalysis Cases



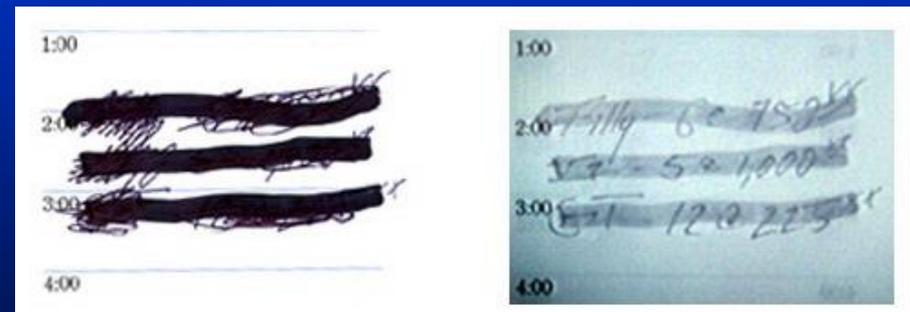
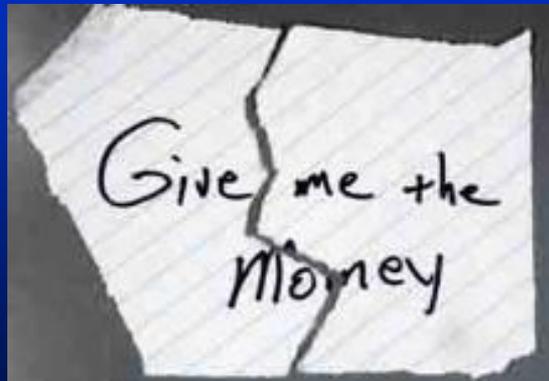
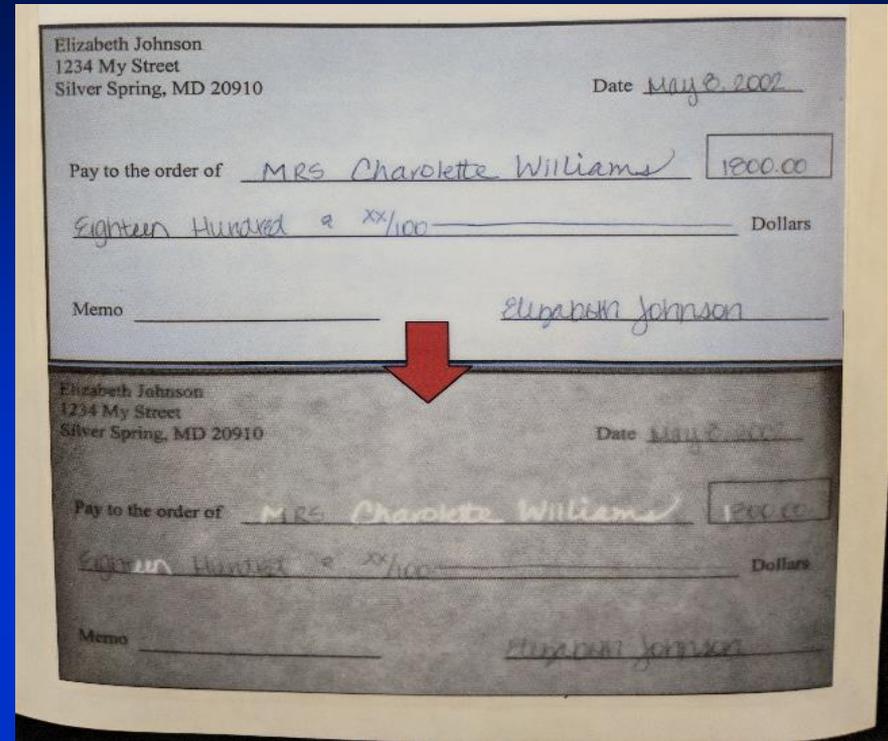
Questioned Documents

- ❑ Is the document authentic?
- ❑ Who was the author?
- ❑ Is there any other information that can be provided for investigative leads?



Documents Unit

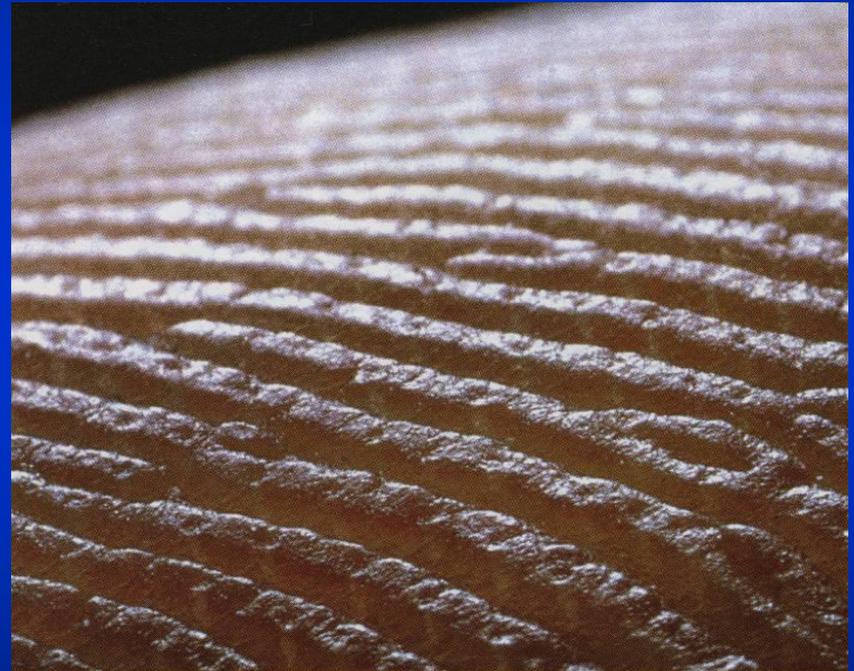
- Handwriting comparisons
- Ink comparisons
- Alterations, erasures, obliterations, indented impressions
- Typewriting comparisons
- Printer/fax examination
- Puzzle matches



Fingerprint Identification - Friction Ridge Skin

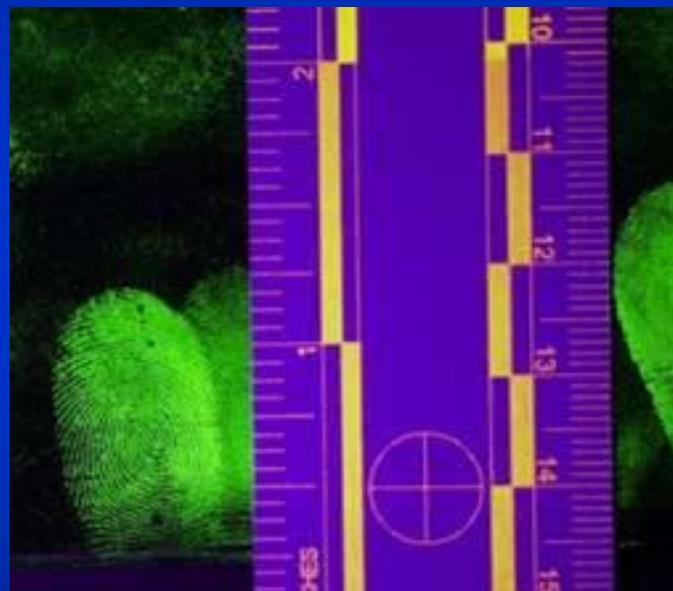
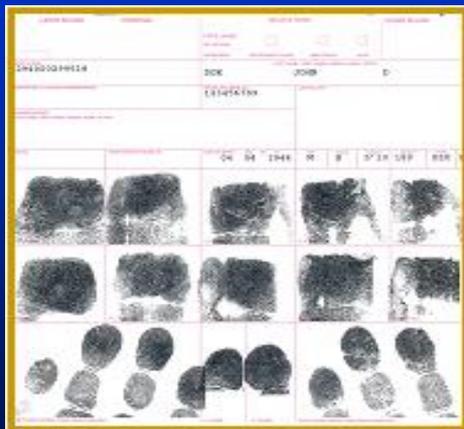
- o Covers the fingers and palms, the toes and soles of your feet
- o The ridge structures are formed during fetal development between weeks 10-12
- o Everyone's fingerprints are different, even identical twins!

Most print evidence is not readily seen with the unaided eye, so some type of development process is used at the scene to help visualize the prints for collection.



Latent Print Unit

- ❑ Locate and develop fingerprints, palm prints, etc.
- ❑ Compare evidence prints to fingerprint standard cards



Different Substrates for LP Evidence

Most Successful

NonPorous

Glass Bottle
Glass Jar
Plastic Bottle
Food Wrappers
Ceramic
Plastic
Pop/Beer Cans

Firearms/Tools

Magazine
Rifle
Pry Bar
Holster/Gun Case
Knife

Tech

Phones
Flash Drives

Tape

Clear Tape
Duct Tape

Drugs

Baggies
Bundles
Scales

Porous

Checks
Cardboard
Paper
Mail/Bank Envelopes

Lifts/Photos

Lifts
Photos

Firearms Unit

- Services provided:
 - Firearm examination/function
 - Ammunition characterization/comparison
 - IBIS/NIBIN Database entry/search
 - Distance determination
 - Serial number restoration
 - Tool mark examination/comparison



Bullet Recovery Tank



FIREARMS REFERENCE COLLECTION

> 1,000 GUNS (Indy)

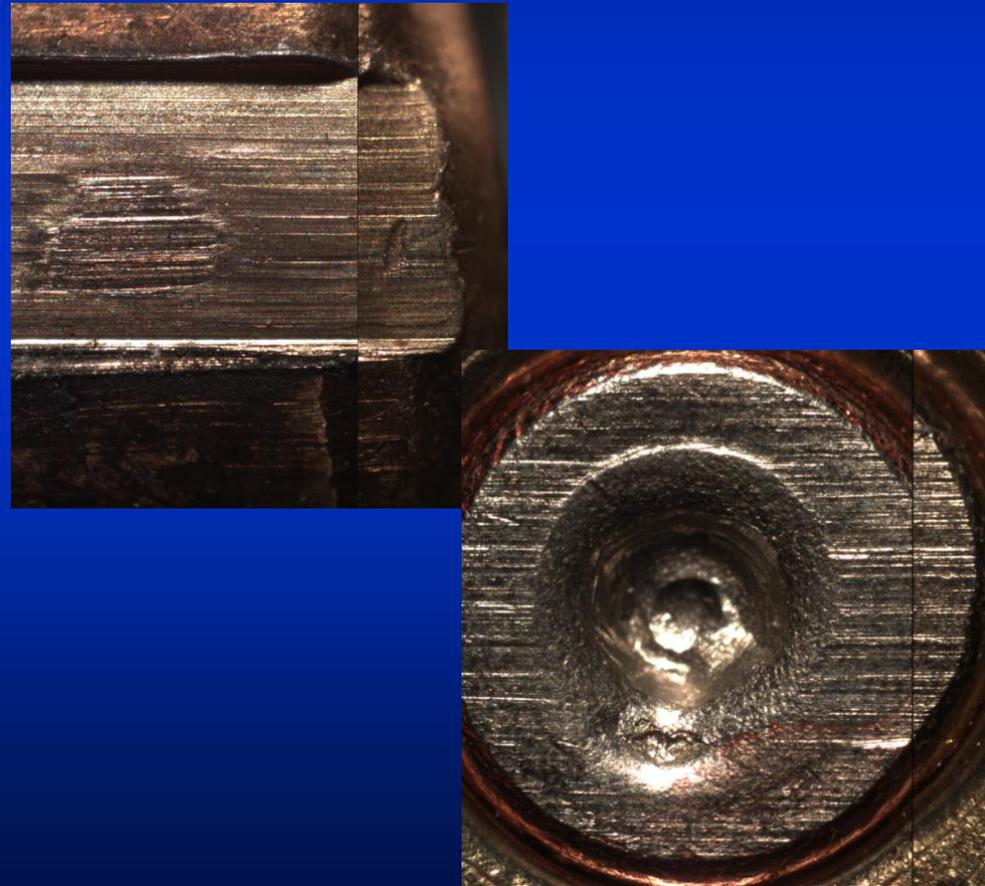


Ammunition Comparison

Comparison Microscope



Bullet, Cartridge Case



Distance Determination, Serial # Restoration, Toolmark Exams

- From muzzle to target

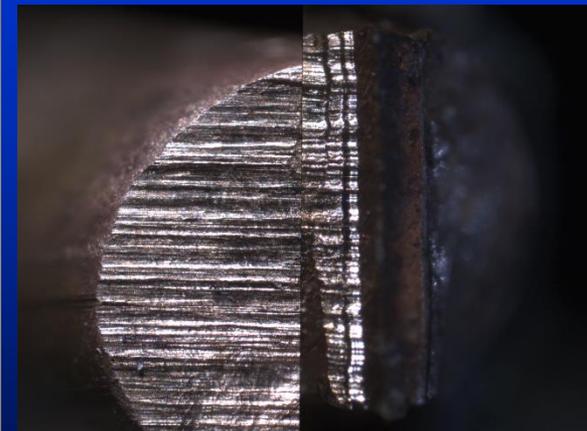
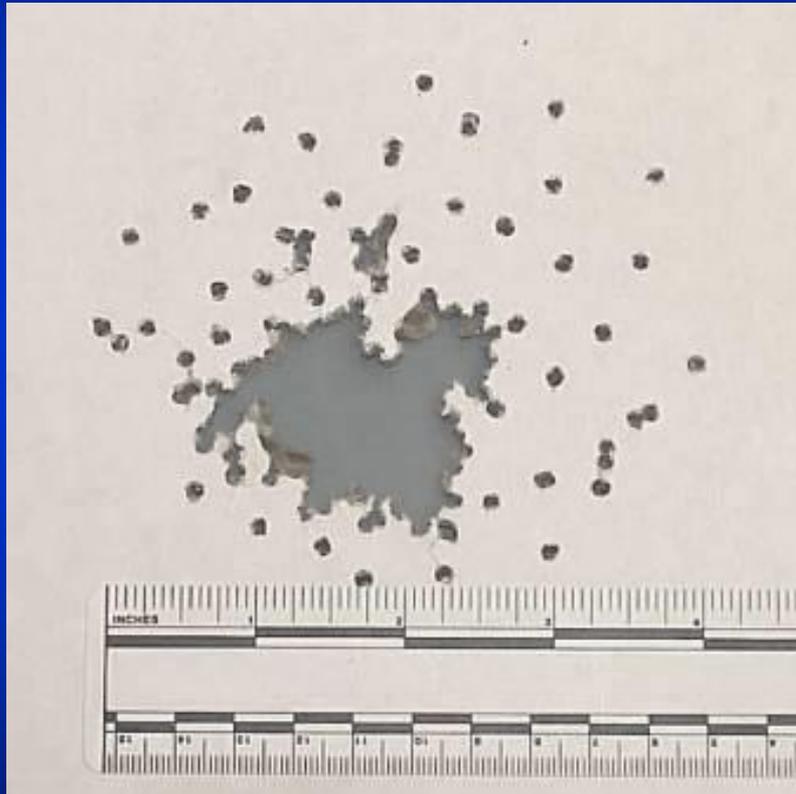
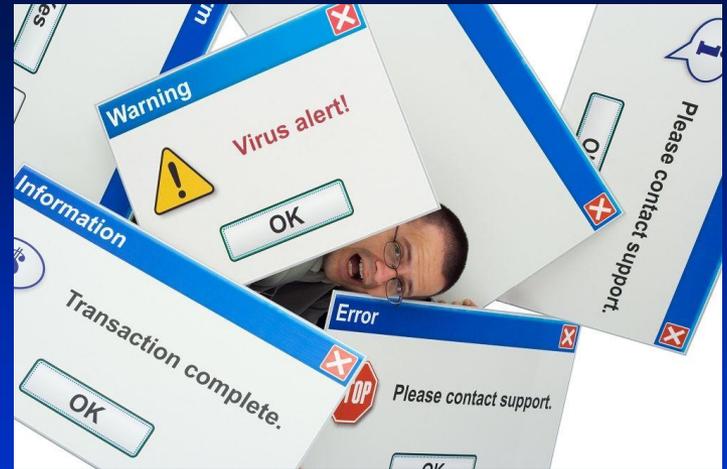


Photo Unit



- ❑ Provides photography services for ISP investigation personnel and the ISP Public Information Office.
- ❑ Maintains a digital management system for all department criminal investigations and crashes (over 300,000 images uploaded in 2020).
- ❑ Printed 1,769 investigative color prints and provided 439 CDs to investigators and insurance companies
- ❑ More than 2.5 million images added since the system started in 2008.

LIMS/IT Unit



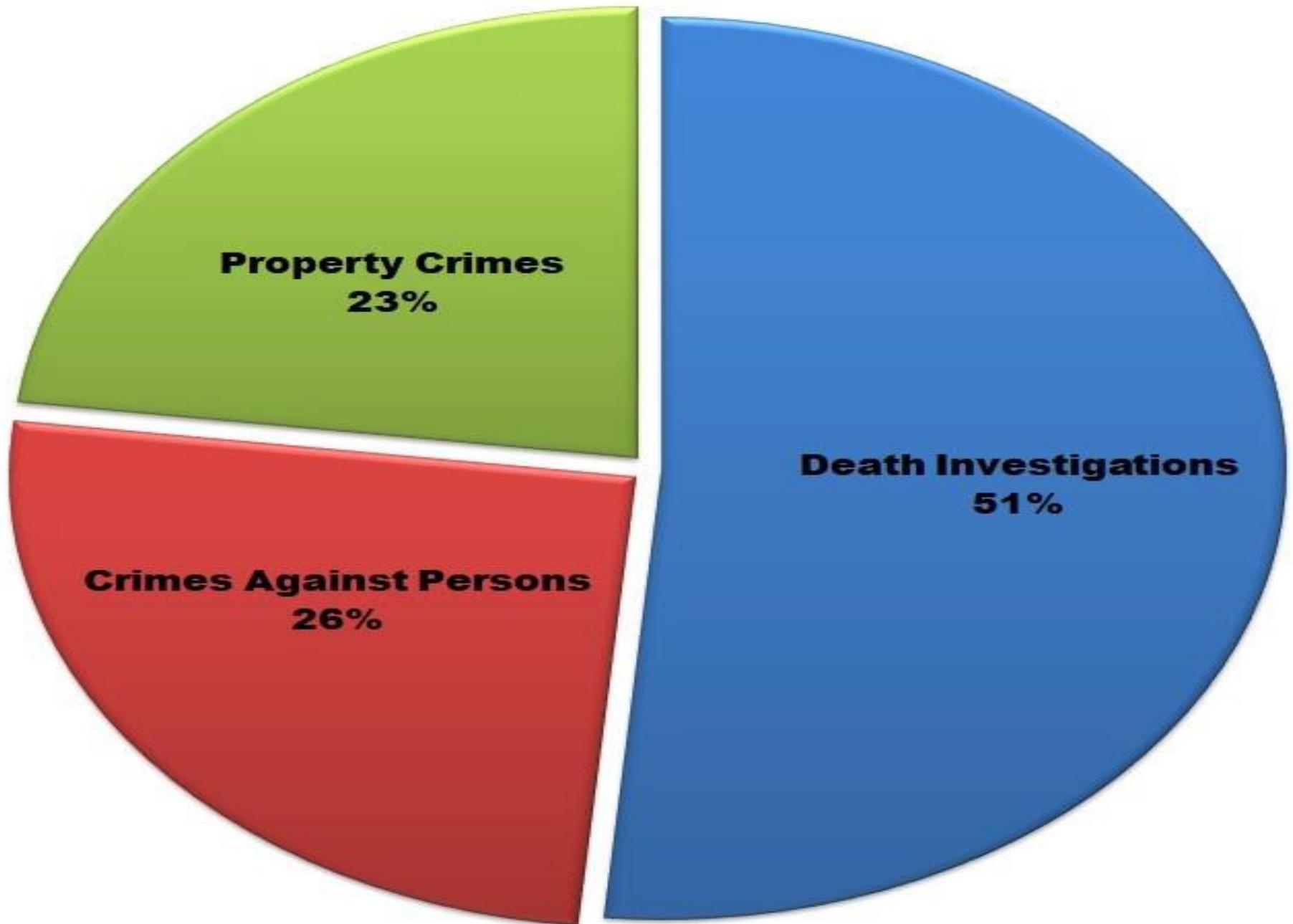
- ❑ Tracks all evidence currently held by lab division and includes analytical results, records and reports.
- ❑ iResults – provides reports to law enforcement agencies & county Prosecutors
- ❑ Supports staff at 4 regional labs and 14 districts

Crime Scene Investigators

- ❑ Available through all Indiana State Police Districts
- ❑ Sworn police personnel
 - Sergeants
 - First Sergeants
- ❑ Responsible for identifying, collecting and preserving crime scene evidence

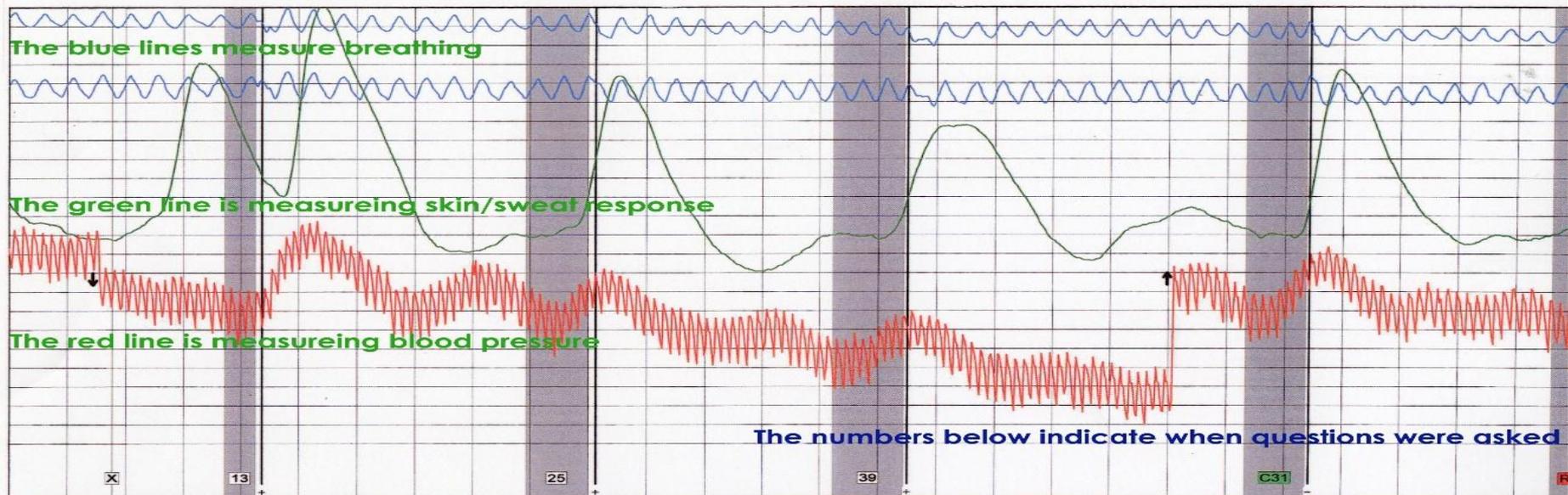


Types of CSI Investigations



Polygraph Unit

- Conduct polygraph tests used to help law enforcement investigations
- Utilized in the employment selection process of certain ISP positions
- Sworn police personnel
 - Sergeants
 - First Sergeants



Exam 1 Chart 1
Subject: ██████████
Examiner: System Administrator
Date: ██████████ View Size: Normal
Time Start: ██████████ PM Duration: 05:32
Cuff Pressure Start: 73 End: 60
S K Y TEST (Other)

Gain Settings:	P2	P1	GS	CA	AU	A2	A3
Recorded: Start	4.1	2.6	3.8	3.5	---	---	---
Recorded: End	4.1	2.6	3.8	3.5	---	---	---
Printed: Start	4.1	2.6	3.8	2.8	---	---	---
Printed: End	4.1	2.6	3.8	2.8	---	---	---
Recorded Electrodermal:	Automatic						
Printed Electrodermal:	Automatic						

FORENSIC DATABASES

“..solving the unsolvable”

- **CODIS (Combined DNA Index System)**
- **IBIS (Integrated Ballistics Identification System)**
- **AFIS (Automated Fingerprint Identification System)**
- **Paint Database Query (PDQ)**

CODIS

(Combined DNA Index System)

- All 50 states now have similar statutes. Began collection in 1996 for crimes against persons offenders. In 2005, all convicted felons added and, in 2018, all felony arrestees added.
- A repository for DNA profiles from unsolved cases without known suspects.
- The program's goal is to compare DNA profiles from collected offenders to DNA profiles of biological samples collected at crime scenes in an effort to tentatively identify potential suspects.
- Searches: Case to case (crime scene unknowns to other unknowns) and case samples to offenders
- State and National Level Searches

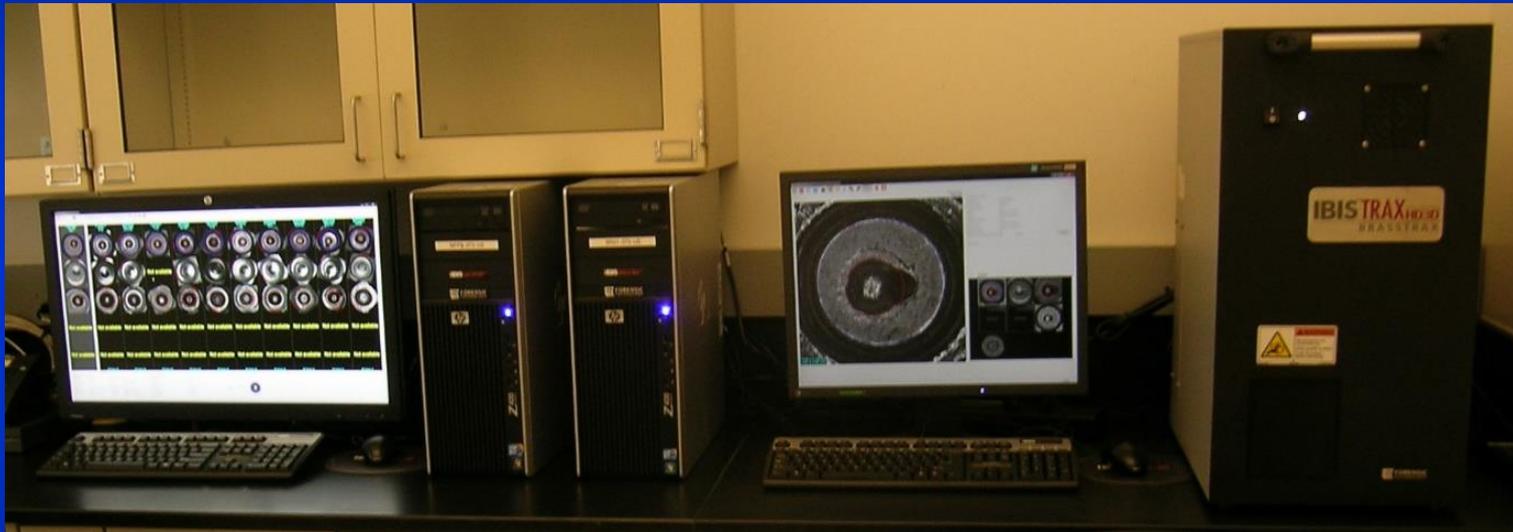
CODIS Stats (as of 6-3-2021)

Number of Investigations Aided	9,291
No-Suspect Cases Linked to Suspect	7,622
Total Offenders Collected	>382,000
❑ Conviction Samples	>293,000
(account for 6,713 hits since collection began in 1996)	
❑ Arrestees Collected	>89,000
(account for 1,187 hits since collection began in 2018)	
Casework Profiles Being Searched	>19,200

56% of unsolved Indiana cases involved in a hit

IBIS/NIBIN

Integrated Ballistics Identification System



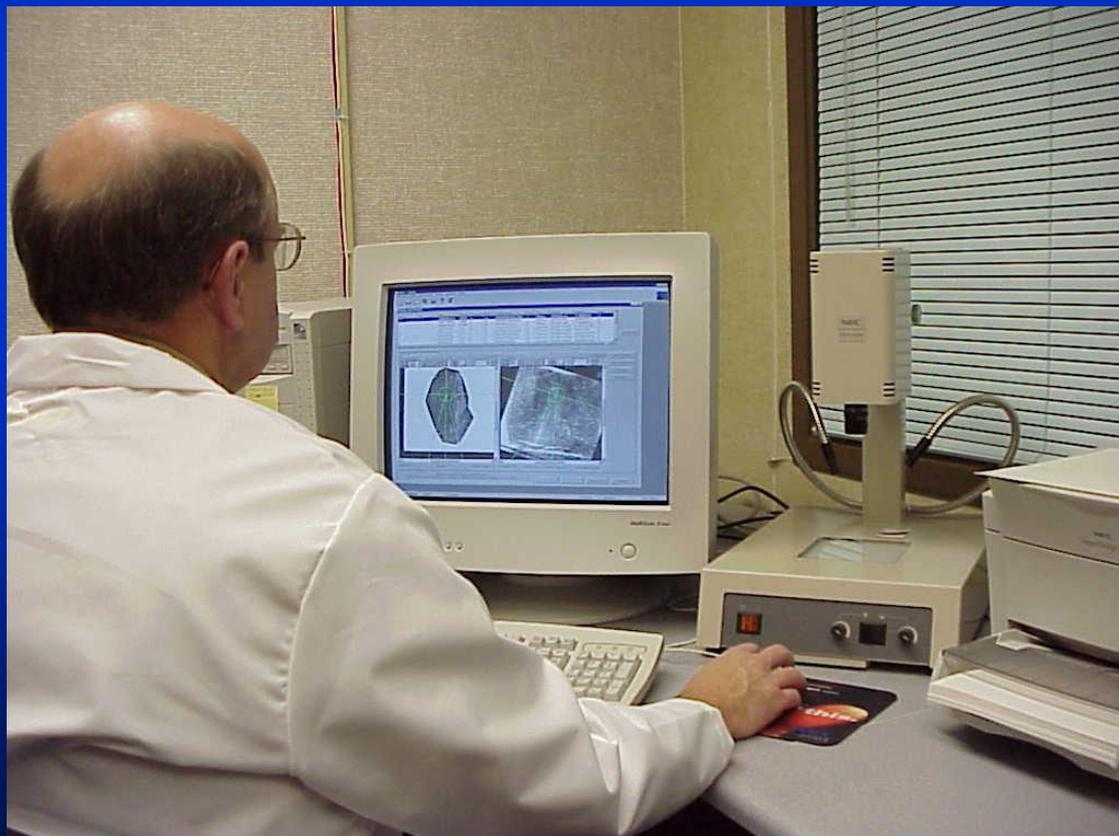
- **National Integrated Ballistics Information Network** (computerized system for acquiring/storing the images of cartridge cases of questioned origin and those fired from known firearms).

IBIS

- Equipment at the Indianapolis and Fort Wayne Laboratories
- Currently have 1,500+ hits since 2000; 206 IBIS hits in 2020

AFIS/NGI

Automated Fingerprint Identification System



EXAMINATIONS

- **Uses digital imaging technology to obtain, store and analyze fingerprint data.**
- **Since 2002, over 1,500 AFIS Identifications; Since 2015, > 700 AFIS Hits; 92 AFIS/NGI hits in 2020**

Paint Database Query (PDQ)

Maintained by Royal Canadian Mounted Police (RCMP)



PDQ: No suspect Hit and Run. Enter paint layer chemistries to generate potential Year, Make and Model Vehicles. Focused mainly with primer layers.

2020 Laboratory Stats

- ❑ Processed 1,388 crime scenes
- ❑ Received 24,048 cases (IRL-13,785, ERL-2,810, FWRL-4,607 & LRL-2,846)
- ❑ Issued reports for 22,395 laboratory cases
- ❑ Average turnaround time was 121 days
- ❑ Conducted 444 polygraph examinations
- ❑ Secured over 360,000 items of evidence

2020 End of the Year Stats

Cases Submitted (Cases Completed)

□ DNA	4,392 (4,284)
□ Documents	35 (36)
□ Drugs	14,739 (13,839)
□ Firearms	3,818 (3,188)
□ Fingerprints	859 (832)
□ Trace	205 (216)

Case Backlog (end of 2020)

<input type="checkbox"/> Biology	857
<input type="checkbox"/> Documents	13
<input type="checkbox"/> Drugs	7,282
<input type="checkbox"/> Firearms	1,157
<input type="checkbox"/> Latent Prints	170
<input type="checkbox"/> <u>Trace</u>	<u>22</u>
<input type="checkbox"/> Totals	9,501

Kathy Jo Baker Homicide



- Kathy Jo Baker, 20 years old
- Son, Ryan Baker, 2 years old
- Went missing from their Riley home on May 22, 1979
- Kathy Jo was found the next day in a remote area off a gravel service road, she had been strangled
- Ryan had a severe skull fracture, he survived but spent months in the hospital

Years without answers...

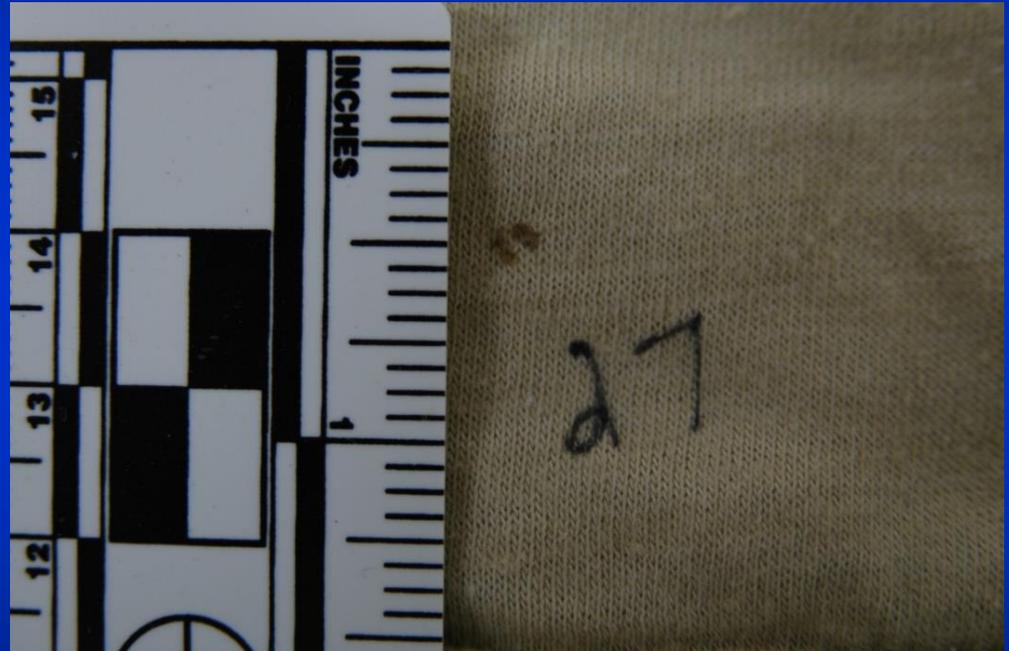
1979

- ❑ DNA was not available
- ❑ No arrests were ever made
- ❑ More than 100 people interviewed
- ❑ Suspects identified but no probative evidence
- ❑ Over 100 pieces of evidence collected

2008 - 2010

- ❑ Tip to police resulted in case being reopened
- ❑ Tip turned out to be an error, no additional leads, however, decided to test evidence with newer technology methods
- ❑ DNA testing turned up a connection to a person who had been listed in passing, during the original investigation

T-shirt from Kathy Jo Baker



CODIS HIT

- ❑ Stain on back of her T-shirt matched to an Indiana Offender
- ❑ Convicted in 1991 of attacking, confining and raping woman
- ❑ Served 15 years in prison and was released in 2006

Other Evidence

- ❑ Farmer reported seeing a yellow car on the service road to the area where Baker's body was found on the day she went missing
- ❑ Farmer deceased by time of trial, so only hearsay
- ❑ Suspect owned a yellow car, a Pontiac Astre (similar to a Chevrolet Vega)



Richard Boswell



- ❑ Richard Boswell
- ❑ Age 58
- ❑ Charged with murder and attempted murder on October 14, 2010
- ❑ Found guilty of both charges on April 22, 2015 (3rd trial)
- ❑ 2 previous mistrials in 2013, Boswell released
- ❑ Sentenced to 100 years (55 for murder and 45 for attempted murder) on May 18, 2015

36 years later, closure for the Baker family



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